Anterior decompression and fusion for cervical neuroforaminal stenosis

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Introduction

Cervical neuroforaminal stenosis is a common cause of neck pain and radicular arm pain. At the entrance of the foraminal canal the nerve root can be encroached by a cartilaginous cap, a bony spondylophyte, a synovial cyst or a combination of them. Additionally bony spurs arising from the uncovertebral (Luschka) joints might compress the anterior aspect of the nerve root, while spurs arising from the superior facet can narrow the posterior aspect of the foramen.

Smith and Robinson, Cloward, Bailey and Badgley developed the anterior approach to the cervical spine in the 1950th. Meanwhile anterior decompression and fusion (ACDF) is the standard surgical treatment of neuroforaminal stenosis in the cervical spine [1].

Case description

A 60-year-old female patient complained about neck pain and right-sided arm pain since many months. Ambulant conservative treatment including pain medication, active and passive physiotherapy, and CT-guided periradicular nerve root injections failed. MRI of the cervical spine demonstrated protrusions of the discs at C5/6 and C6/7 and osteochondrotic changes in multiple levels. Especially at C5/6 and C6/7 spondylophytes resulting in a neuroforaminal stenosis of the C6 and C7 nerve root on the right side could be detected. Temporary improvement of the complaints was achieved by intensified inpatient multimodal pain therapy. However, since September 2012 she developed once again neck, right shoulder and arm pain with beginning numbness of the arm and occasional occurrence of electrifying pain in the right thumb. Beside this, patient felt weakness in the right biceps muscle. CT-guided periradicular nerve root injections failed to improve symptoms. Hence, due to the intractable neck and arm pain and the senso-motoric C6-syndrome as well as sensoric C7-syndrome an ACDF with decompression of the neuroforamen C5/6 and C6/7 was indicated.

Surgical procedure

Anterior surgery was performed by a standard left side approach. The patient was positioned supine on a radio-lucent table with the head placed in a Mayfield headrest.

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Gentle traction was given to the upper limbs to get a good visualization of segments C5/6 and C6/7 in lateral fluoroscopy. A standard Smith-Robinson anterior approach was used to expose the levels C5/6 and C6/7. The correct disc levels were confirmed under fluoroscopy and distraction of both disc spaces with a Caspar-Distractor was applied. Under microscopic visualization, discectomy C5/6 and C6/7 was done including a resection of the posterior longitudinal ligament. Retrospondylophytes were removed by undercutting with punches. The Neuroforamen C5/6 and C6/7 on the right side were decompressed by punches, until the C6 and C7 nerve roots were proved to be free. Result of decompression was checked by palpation with a nerve hook and documented by lateral fluoroscopy. After this, a zero-profile (“Zero-P”) cage of suitable size and shape was implanted in both levels. The device contains a PEEK body with a tantalum marker to control the position. A small titanium plate is included, which contains four screw holes for angle-stable screw fixation. Two different implant configurations are available, a convex shaped endplate and a lordotic shaped [2]. In this case, lordotic shaped “Zero-P” cages, prefilled with DBM[®] (Demineralized Bone Matrix), were inserted with an implant holder/aiming device. The correct position of the cages was controlled by using an image intensifier. Distraction was released. After drilling the pilot hole through the aiming device, the first locking screw was inserted. The other three holes were drilled guided by the aiming device. After removing the aiming device the three screws were inserted with torque limitation (1.2 Nm). The implant should be in line with the anterior margin of the bone.

Blood loss was 250 ml and operation time was 2 h.

Postoperative procedure

The patient was fully mobilized on the first day after surgery. No cervical collar was necessary. A standardized

rehabilitation program was conducted. Postoperative plain X-rays showed good position of implants and a good restoration of sagittal profile.

Discussion and conclusion

Key principle is the sufficient neuroforaminal decompression via a discectomy and removal of parts of the uncovertebral joints. It is still controversial, if the removal of the posterior longitudinal ligament is necessary. However, adequate decompression is mandatory and has to be proven by palpation. Perforation of the endplates should be avoided to prevent subsidence of the cage. Beside this care should be taken not to over-distract the motion segment. Zero profile implants have a theoretical benefit with respect to the amount of postoperative dysphagia and adjacent segment degeneration. Stand-alone cages without any osteosynthesis tend to result in a cage migration, pseudarthrosis of the motion segment and a loss of correction [3, 4].

Conflict of interest None.

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